

genus is called after Stoliczka. This memoir is accompanied by three excellent plates.

Several other memoirs are expected ere this work will be complete. When finished, it will form a worthy monument to the memory of Ferdinand Stoliczka.

CRYPTOGAMIC FLORA OF SILESIA

Kryptogamen-Flora von Schlesien. Herausgegeben von Prof. Dr. Ferdinand Cohn. Zweiter Band, Erste Haelfte: Algen. Bearbeitet von Dr. Oskar Kirchner, und Zweite Haelfte: Flechten. Bearbeitet von Berthold Stein. (Breslau: J. U. Kern, 1878 and 1879.)

THE second volume of the "Cryptogamic Flora of Silesia," edited by Prof. Ferdinand Cohn, has now been completed in two parts. The first is devoted to the algæ, and the second to the lichens, the former having been worked out by Dr. Oskar Kirchner, while the latter part, on the lichens, is from the pen of Berthold Stein. The algæ of Silesia are, of course, fresh-water forms, and include a very fair proportion of all the species recognised as natives of Germany. Thus, reckoning the German algæ-flora at 1,688 species, the Silesian flora contains 794, or 47 per cent. Some of these have not yet been found out of Silesia, Kirchner giving a list of 40 species not yet detected elsewhere, and of these a considerable proportion are new species described for the first time in the present flora. Desmidiæ, Diatomaceæ, and phycchromaceous forms furnish no less than 600 out of the total of 794 species, most of the others being Protococcoideæ and Confervoideæ, these numbering 88 and 86 species respectively, while the remainder is made up by 11 Florideæ, Batrachospermum and allies, and 6 Siphonæ. The work may therefore be said chiefly to describe the Desmidiæ and other Conjugatæ, 225 in number, the Bacillariaceæ (Diatomaceæ), 195, and the 185 Phycchromaceæ. The hypsometrical distribution of the species is carefully given, according to the plan adopted in the first volume, the whole country being divided into four regions. The first includes all land below the elevation of 150 metres, the second all elevations between 150 and 500 metres, the third from 500 to 1,100 metres, and the fourth from 1,100 to 1,500 metres. No less than 63 species, or 8 per cent. of the total number are met with in all the four regions, these species, however, being usually forms widely distributed in Europe. To the fourth or highest region there belong 16 special species out of a total of 104 in the whole region. The third or second highest district includes 131 species, or 16.5 per cent. of the whole, and of these 20 are special. The great majority of the species belong to the first and second regions, a distribution very different, as we shall presently see, from that of the lichens. The first or lowest region contains 472 species, or 59.5 per cent.; the second 612 species, or 77 per cent., while of these, 116 species are only found in the first, and 219 in the second, region. Lastly, it is found that the two regions together contain no fewer than 613 species not found at all in the higher districts.

A considerable part of the introduction is filled with a history of the study of Silesian algæ and of the gradual progress made by different workers in the elucidation of the species and localities. Then follows a long and

excellent account of the anatomy and reproduction of the algæ, which are here defined as chlorophyll-bearing cellular plants not differentiated into stem and leaves. The unicellular and the multicellular thallus is then described, and the various gradations noticed among the unicellular forms, from the spherical Protococcus up to the highly differentiated unicellular Caulerpa, the forms of the multicellular thallus being treated in the same way. Paragraphs are devoted to the cell, cell-wall, cell-contents, and to the different colouring matters contained in the cells of the different groups. The modes of reproduction, non-sexual and sexual, to be observed in the algæ are fully described. As might be expected in a flora, Dr. Kirchner does not employ the subdivisions of the Thallophytes as defined by Sachs, although he fully recognises and points out the affinities exhibited by many chlorophyllaceous and colourless Thallophytes. The algæ, therefore, are considered as a special class, and are subdivided for the purposes of this flora into six orders and into sixteen families. The orders are Florideæ, Confervoideæ, Siphonæ, Protococcoideæ, Zygosporæ, Schizosporæ. The Protococcoideæ are made to include as families the Volvocaceæ, Protococcaceæ, and Palmellaceæ, while the Zygosporæ include the families Conjugatæ and Bacillariaceæ. Lastly the order Schizosporæ includes the Nostocaceæ, with five subdivisions, Rivulariæ, Scytomenæ, &c., and the Chroococcaceæ.

Under the different families the genera and species are fully described, and apparently in a manner well calculated to render the work extremely useful to all botanical students.

The second half of the second volume contains the Lichens, by Berthold Stein. The general treatment of the subject is the same as that already mentioned in the case of the algæ. The introduction, giving an historical account of the progress of Silesian lichenology, the hypsometrical distribution of the species, and then an account of the anatomy and reproduction of lichens. Stein, as might be expected, is an opponent of Schwendener's lichen theory, and bases his objection on the ground that many observations have shown that the first gonidia of the lichen are developed by division or budding from certain side branches of the lichen hyphæ, in a manner probably somewhat similar to the formation of the new cells of Saccharomyces. This alleged fact, which he does not support by any reference to his own observations or to those of other botanists, he considers of itself renders the whole of the Schwendener-Bornet theory untenable.

The Silesian lichens include 705 species belonging to 158 genera. The main feature in regard to the genera being the reduction of Lecidea and Lecanora, to comparatively limited dimensions by the adoption of many new genera. The distribution of the Silesian lichens, according to Stein, confirms the statement that lichens are the "Children of the Air and of the Light," most of them inhabiting the higher parts of Silesia in regions three and four. Common to all the four regions are 76 species, or 11 per cent. of the total given by Stein of 678 species in the introduction, although the description gives 705 consecutive numbers. The first region contains 84 species, of which only 8 are peculiar to it. The second region contains 281 species, or about 41 per cent. of the whole, 115, or 17 per cent. being limited to it. The third

region contains 405 species, or 60 per cent., and of these 82, or 12 per cent., are special. Lastly, the fourth region contains 291 species, or 42 per cent., and of these 126, or 18 per cent. are found in it only. No fewer than 18 of these are found in the basalt of the lesser Schneegrube, which Stein calls the "El Dorado of Lichenologists," as 16 of them are not met with elsewhere.

Stein defines lichens as being those thallophytes in which the thallus exhibits a union of gonidia, threads or hyphæ and chlorophyll-bearing, or phycochromaceous cells, or gonidia, the fruit-body containing the spores in asci. The structure of the thallus is described in full, as well as that of the reproductive organs, the spermogonia and apothecia. Spermogonia, now recognised as the male reproductive organs, have been met with in most lichens, but are as yet unknown in the genera *Solorina*, *Myriangium*, and *Siphula*. Usually spermogones and apothecia occur in the same plant, lichens being thus mostly monœcious, but occasionally the two kinds of organs are on different plants, as in *Ephebe pubescens*, which is diœcious. The origin of the apothecium from the ascogonium and carpogonium is described from the observations of Stahl, and the non-sexual reproduction by the pycnides with their stylospores or conidia, is also mentioned, while the formation of soredia is described as spontaneous division of the thallus. Most lichens produce soredia, and we may form a new plant, or several may unite together to form a single new thallus. The structure of the gymnocarpic apothecium with its four layers, the hymenium, sub-hymenium, hypothecium and excipulum, is detailed in full.

The division of the lichens into subordinate group calls for no remark, while to assist the student a very good analytical key to the genera is given, occupying no less than seven pages. In the description of the species the chemical reactions are given, but Stein seems very wisely to reject all species *only* recognisable by chemical tests, *i.e.*, without some structural character.

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OUR BOOK SHELF

Blowpipe Analysis. By J. Landauer. Authorised English Edition, by James Taylor and William E. Kay. (London: Macmillan and Co., 1879.)

THE writer of this treatise, as appears from his preface, has designedly restricted its scope by omitting all reactions peculiar to minerals, on the ground that most works already in existence upon the subject treat the mineralogical part in great detail, and devote comparatively little attention to its chemical aspects. This resolution is unfortunate, as the principal justification for the systematic teaching of blowpipe analysis is to be found in the facility thereby acquired in the identification of the constituents of minerals by simple means when the resources of a complete laboratory are not at hand; and by omitting all characteristic mineral reactions the interest of the work is decidedly lessened. Within these restricted limits, however, the book is a very good one and likely to be useful to students in chemical laboratories as an adjunct to the ordinary text-books on analysis, and this utility will be increased by the chapter on Bunsen's flame reactions, which have for many purposes replaced the older methods of investigation. The matter is condensed in a fashion rather unusual in works of German origin, and the arrangement is good though somewhat troublesome to use, on account of the adoption of a double

system of numeration by pages and paragraphs. Neither author nor translators have, however, paid sufficient attention to the necessity, or at any rate desirability, of properly proportioning the different parts of the blowpipe. In this respect the examples figured are to be avoided, as they are far too narrow in the tube to be used with anything like comfort. We should also be disposed to give the first instead of the second place to the Plattner oil-lamp when compared with the gas-flame. The latter is undoubtedly more convenient, as saving the trouble of trimming and cleaning; but for all accurate work a good lamp or even a candle flame is generally preferable as being more readily controlled than gas. A self-acting blowpipe on the principle of the Sommellier compressor made with two bottles, a length flexible tube, and a gallon of water described on p. 5, deserves notice for its ingenuity, but such contrivances are not to be recommended in practice, for they are, to quote the words of a leading American mineralogist, "unnecessary when the student has sufficient enterprise to learn to blow the ordinary instruments, and no others will be likely to make much progress in blowpipe analysis."

The Zoological Record for 1877; being Volume Fourteenth of the Record of Zoological Literature. Edited by E. C. Rye, F.Z.S. (London: Van Voorst, 1879.)

IT is now just fifteen years ago since the project of the *Zoological Record* was first started by Dr. Günther. The difficulties of the undertaking were many, the labour was great, the reward uncertain. It would seem a proof, however, of there being a necessity for such a publication when we find it still pursuing the even tenour of its way, under the auspices at present of an association, and favoured by considerable money grants from the Royal Society, the British Association, and the Zoological Society of London. The original staff of recorders have now all but Dr. von Martens ceased from their recording labours and a younger generation takes their place.

The pagination is now, we observe, of a new, perhaps of a more scientific, but certainly of a puzzling type, each class having a pagination to itself, so that the sequence of the classes has first to be learnt and then only can one find the object looked for; that this may be a convenience to the printer we acknowledge, but we do not think it a commendable plan. We confess too that we like the method still adopted by some of the older recorders, of giving first a list of the more important publications in a group, then an account of the works on the anatomy and embryology of the same, next the contributions to faunas, and lastly, the new forms, &c., under their orders and families. To say the least the editor would consult the convenience of the student if he would suggest an uniformity in practise in these particulars to his staff. Thus making all due allowance for the difficulties in the way of classifying the Vermes, yet the manner in which the new genera and species are recorded makes it rather difficult to find out what has been done in this group during 1877. The editor too, for he alone could do it, might have added to the last paragraph but one treating of the worms, a reference to "Moll. 55," where pretty much the same facts are stated as we find recorded in "Verm. 21." Amid such a quantity of matter it would be simply an impossibility that mistakes should not sometimes occur, and indeed on a careful survey of this volume such have very rarely turned up. In "Ech. 5" we may remark that the notes by "G. McIntosh" referred to should be credited to H. W. Mackintosh, probably not even a relation of the person named. In "Coel. 13" is not *Cylicozaa* a misprint for *Calycozoa*? At "4 Spong." we read, "Gen. *Ceratella*, Gray, and *Dihitella*, Gray, are undoubtedly the same genus, *C. labyrinthica*, sp.n. (*vide infra*)" (why is the accent always on this *a*). We have looked both below and